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THE RELATION OF HEALTH TO RACIAL CAPACITY: THE EXAMPLE OF MEXICO*

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In geography and history few words play a more important part than "race." Yet few ideas are more vague than those indicated by this word. It is doubtful whether the true qualities of any race on earth can be accurately defined. This is because what we call racial character is a compound of three distinct items: (1) innate physical and mental characteristics, which are the result of inheritance and are thus truly racial; (2) the effects of training, that is of education, religion, government and other institutions, which combine to determine the way in which the innate capacities shall be directed; and (3) health and vigor, which determine the energy with which a people uses its innate powers in the pursuit of the ends inculcated by training. In the present paper I propose to take the last of these three, namely, health and vigor, and after showing how it is measured, show how it is related to geographical environment. The specific example of Mexico will be taken to show how health plays a part in determining racial character.

MORTALITY AS A MEASURE OF HEALTH

The death rate is almost universally recognized as the best measure of the health and vigor of a community. Except in the rare case of epidemics like the influenza epidemic of 1918, physicians find that in unhealthful seasons there is always a premonitory wave of minor ailments followed by a wave of severe sicknesses, and then by a wave of deaths. The ratio between these three conditions—minor ailments, severe sicknesses, and deaths—doubtless varies from country to country, but the same general principle applies everywhere.

For the United States as a whole we can form a fair estimate of this ratio, and that will serve as a guide elsewhere. In the "registration area" of this country (which now includes 72 per cent of the population) the annual death rate is now about 14 or 15 per thousand of the population. This means that the average individual lives approximately 35 years. During the adult portion of those 35 years each person who is actively at work has on an average about 6.6 days a year of illness severe enough to require a doctor, as we know from recent surveys made by the Metropolitan Life Insurance Company. Since there are also sick days when the doctor is not

* The author's article, "The Factor of Health in Mexican Character," *Journal of International Relations*, Vol. 11, 1920, which should be read in connection with the above, takes up the same discussion from a social standpoint.

called, since children and old people have more sickness than persons in the prime of life, and since persons not strong enough for steady work are not included in the Insurance Company's figures, it seems safe to say that the average person has 8 or 9 days per year when he is not well enough to be at work, or nearly 300 such days during the average lifetime of 35 years.

TABLE I—COMPARISON OF DEATH RATES IN VARIOUS CITIES OF THE WORLD

CITY	YEARS	AVERAGE DEATHS PER THOUSAND
Amsterdam	1901-1913	12.6
London	1901-1913	14.7
Copenhagen	1901-1913	14.7
Berlin	1901-1913	15.2
St. Louis	1901-1913	16.3
Vienna	1901-1913	16.7
Paris	1901-1913	16.9
Denver	1901-1913	17.2
New York	1901-1913	17.3
San Francisco	1901-1913	17.7
Havana (a)	1907-1911	18.7
Budapest	1901-1913	19.2
Baltimore	1901-1913	19.4
Petrograd	1901-1913	22.6
Moscow	1901-1913	26.1
Calcutta	1910-1912	26.1
Madrid	1905-1908	28.6
Johannesburg (b)	1903-1912	29.5
Panama	1912-1916	30.1
Bombay	1910-1912	37.0
Madras	1910-1912	38.7
Veracruz	1910-1913	41.2
Mexico	1901-1913	45.7
Cairo (c)	1910-1916	49.2
Lucknow	1907, 1910, 1911	58.5

(a) The rate given for Havana is probably too low as it is more than likely that many deaths are not reported.

(b) Natives and Euraficans only.

(c) Egyptians only.

As to minor ailments few statistics are available. It has been found, however, by the New York State Commission on Ventilation under the chairmanship of Professor C. E. A. Winslow, that at all times during the winter an average of a tenth of the New York school children have colds or other diseases of the respiratory organs aside from tuberculosis. Such diseases in severe forms cause a sixth or a seventh of all deaths. This means that for each death from respiratory diseases there are 50 colds, or an average of a cold and a half per year during an ordinary lifetime. This figure appears too small, for the average person certainly suffers from colds at least two weeks

per year. If a similar ratio prevails between deaths and minor ailments of other types such as headaches, indigestion, anaemia, nervous affections, and diseases of the circulatory system, the average person, even in the more healthful parts of the United States, has some minor ailment about half the time. Hence we may roughly frame our ratio thus: For one death there are about 300 days of severe sickness and 6,000 days of minor ailments. If the death rate elsewhere is double or treble the rate in our own country, the little ailments and the sicknesses which do so much to prevent us from doing our best work and being our best selves are also much more numerous than here. How great an effect such ill health must have on "racial character" and on civilization, each reader can judge by a comparison of the achievements of himself and his friends when they are feeling their best and when they are "under the weather."¹

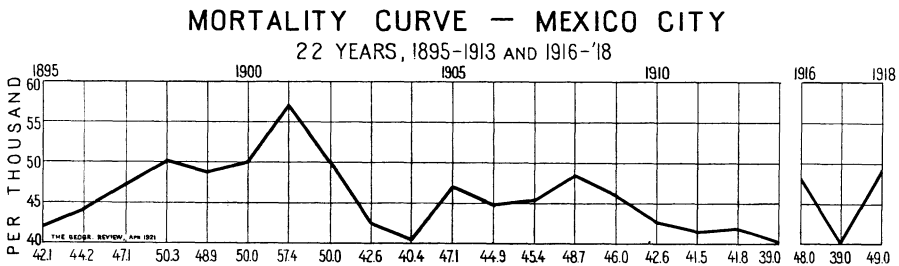


FIG. 1

THE APPALLING DEATH RATE OF MEXICO

Let us now turn to Mexico and see how its death rate compares with that of other parts of the world. The available statistics are scanty and inaccurate. Nevertheless they at least show the minimum mortality. Since many deaths are not recorded, the figures err on the side of giving Mexico a fair name. In only two places, Mexico City and Veracruz, are they sufficiently full to be worth using for our present purpose, but fortunately these two places represent the two main types of environment, namely, the high central plateau where the great majority of the people live, and the coastal lowlands.

All parts of Mexico, including even the plateau, appear to be terribly handicapped by ill health. How bad the conditions are on the plateau may be judged from the statement of a Mexican official named Pani,² who in 1916,

¹ Since this article was written Mr. Wallace Thompson has called my attention to the fact that owing to the lack of medical care fatal illnesses in Mexico are generally of shorter duration than they are in the United States. The fact that of the 467,985 deaths registered in Mexico in 1910 only 139,008 were listed as "classified by doctor," and 328,957 as "unclassified" seems to indicate that two-thirds of the deaths occurred without medical attendance. Moreover, under such circumstances minor ailments develop into severe illnesses sooner than in this country. Hence, each death is associated with less than the 300 days of severe illness and the 6,000 days of minor ailments which seem to be the average in the United States. Even so, however, the amount of illness among the Mexicans must be far in excess of what prevails among us.

² A. J. Pani: *Hygiene in Mexico [City]: A Study of Sanitary and Educational Problems*, New York and London, 1917. Reviewed in the *Geogr. Rev.*, Vol. 8, 1919, p. 200.

by order of President Carranza, made a study of the health of Mexico City. In his book he makes the remarkable assertion that Mexico City "is, assuredly, the most unhealthful city of the whole world." Coming from a Mexican, and a Mexican official at that, this is truly astonishing, but it is close to the truth. In Table I the death rate of Mexico City from 1901 to 1913 is compared with that of twenty-four other cities during the same period, so far as the available figures permit, while Veracruz is given for 1910-1913. It is not surprising to find Veracruz worse than Bombay and Madras which much resemble it in climate, but it is surprising that the death rate of Mexico City is exceeded only by that of Cairo in Egypt and Lucknow in northern India. These two cities are preëminently unhealthful

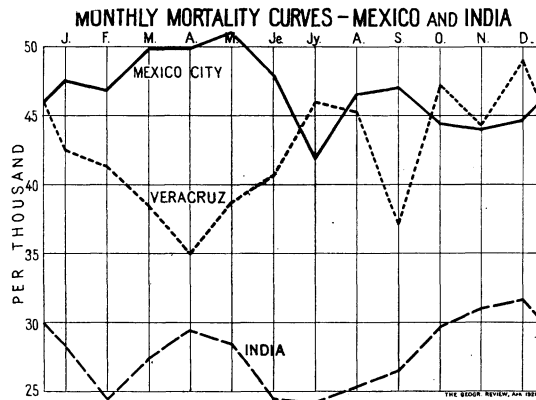


FIG. 2—Graph comparing the seasonal death rates in Mexico and India. The Mexican highland is represented by statistics for Mexico City, 1895-1918, the lowland by Veracruz, 1911-1913; statistics for India are for the period 1905-1914.

even in their unhealthful countries, for all the cities of Egypt had a combined death rate of 38.6 for 1909-1916 as against Cairo's 49.2 for 1910-1916; while Lucknow is twice as unhealthful as hot, tropical Calcutta and about half as bad again as the still more tropical cities of Bombay and Madras. When it is remembered that in Mexico City there is probably more negligence in recording deaths than in any of the other cities, except perhaps Havana and Veracruz, and hence that the death rate is really higher than the figures indicate, it is evident that we are dealing with one of the most unhealthful of all the places where people live in large numbers.

REASONS FOR HIGH MORTALITY IN MEXICO CITY

In view of the fact that the Mexican plateau has usually been considered one of the most healthful parts of the tropics, this conclusion is not only surprising but disconcerting. The mind at once inquires whether there may

not be special, local causes of ill health which can easily be eradicated. Pani says that there are two such causes. One is the location of Mexico City in an old lake bed, and the other is the poor sanitation of the city. Both causes are real, but neither offers more than a partial explanation of the extremely high death rate. The old lake bed, as Pani truly says, becomes wet and swampy in the rainy season, but this does not increase the death rate. It might do so if the swamp harbored malarial mosquitoes, but Mexico City is almost free from malaria (see Fig. 3). As a matter of fact the death rate of Mexico City diminishes markedly during the rainy season in summer, as appears in Figure 2, and is lowest at the very time when the lake bed becomes most swampy.

Pani's other reason is that Mexico City is crowded and unsanitary, poorly fed, poorly housed, poorly governed, and subject to epidemics. Hence its death rate is higher than that of the surrounding country districts and does not truly represent the potential healthfulness of the Mexican plateau. This is undoubtedly true, but making due allowance for the disadvantages inherent in a large city it still appears that the death rate is abnormally high. Moreover, the entire Federal District shares with Mexico City its unenviable conditions of bad health. The following table shows the high mortality in the suburban "municipalities." These municipalities are not simply urban centers, but each contains a considerable rural section, that of Xochimilco covering 204.3 square kilometers, that of Milpa Alta, 277.1, and that of Tlalpam, 317.5. Moreover several of these towns with their surrounding territory stand well up off the flat valley floor and, as appears from their population, are not large cities.³

TABLE II—MORTALITY IN THE SUBURBAN MUNICIPALITIES OF
THE FEDERAL DISTRICT, MEXICO (1911)

MUNICIPALITY	TOTAL POPULATION	AREA IN SQ. KILOMETERS	DEATH RATE PER THOUSAND
Tacubaya	37,552	65.1	35.6
Tacuba	36,078	13.9	30.7
Xochimilco	30,093	204.3	36.7
Ixtapalapa	24,507	161.6	43.8
Mixcoac	21,812	28.8	42.3
Guadalupe Hidalgo	18,344	75.0	52.0
San Angel	16,734	95.2	45.9
Milpa Alta	16,268	277.1	39.0
Tlalpam	15,448	317.5	36.4
Atzacapotzalco	14,419	37.5	39.4
Coyoacán	13,230	57.7	43.0
Cuajimalpa	5,193	87.1	34.6
Federal District	720,753	1,498.8	43.7

³ Data from Pani, *op. cit.*, p. 38.

It will be seen that the death rate nowhere falls below 30.7, while in the municipality of Guadalupe Hidalgo, virtually a part of Mexico City, it goes as high as 52 per thousand.

Pani might well have gone farther in pointing out that the high death rate of Mexico City is due in part to the poor administration of the Mexican government, and to the complete lack of sanitation. Nevertheless, it is doubtful whether an efficient European government such as Great Britain could reduce the Mexican death rate as low as that of Calcutta, for example, although that city has the disadvantage of being hotter, damper, and larger than the Mexican capital. The reason for thinking this is that the British have not succeeded in doing so in cities like Cairo, Lucknow, and various others of northern India. Even in Johannesburg, which has an advantage over Mexico City in latitude, rainfall, change of seasons, age of the population, and size of the city, British rule has reduced the death rate only to about 29.5.

CLIMATIC CAUSES OF MEXICAN ILL HEALTH

The great cause of most of the poor health of Mexico appears to me to be the climate. Our task is to find out what particular elements of the climate are most important. The common idea is that damp steady heat is much the worst condition, while dry clear air at a moderate temperature is supposed to be much the best. The facts, however, by no means bear out this conclusion. Omitting Havana because of the doubtful character of its statistics we may divide the tropical or almost tropical cities of Table I into three groups:

(1) *Low, moist, and hot*: Calcutta, Panama, Bombay, Madras, and Veracruz. Average death rate 34.6

(2) *High, dry, and cool*: Johannesburg and Mexico City. Average death rate 37.6.

(3) *Low, dry, and hot*: Cairo and Lucknow. Average death rate 53.8.

Of course the number of cities in these three groups is by no means enough to lead to positive conclusions. Many other facts, however, point so clearly in the same direction that we may regard the groups as typical. They lead to the following conclusions:

(1) Tropical highlands have by no means the advantage in health that is usually supposed.

(2) Dry tropical regions are in general worse than those that are moderately moist, provided we consider only those places from which such scourges as malaria and yellow fever have been eliminated.

(3) Among the well populated parts of the tropics undue dryness on the one hand and monotony on the other do almost as much harm as high temperature. This does not mean that extreme humidity is good, but the point that we are here making is that, in spite of the popular impression to

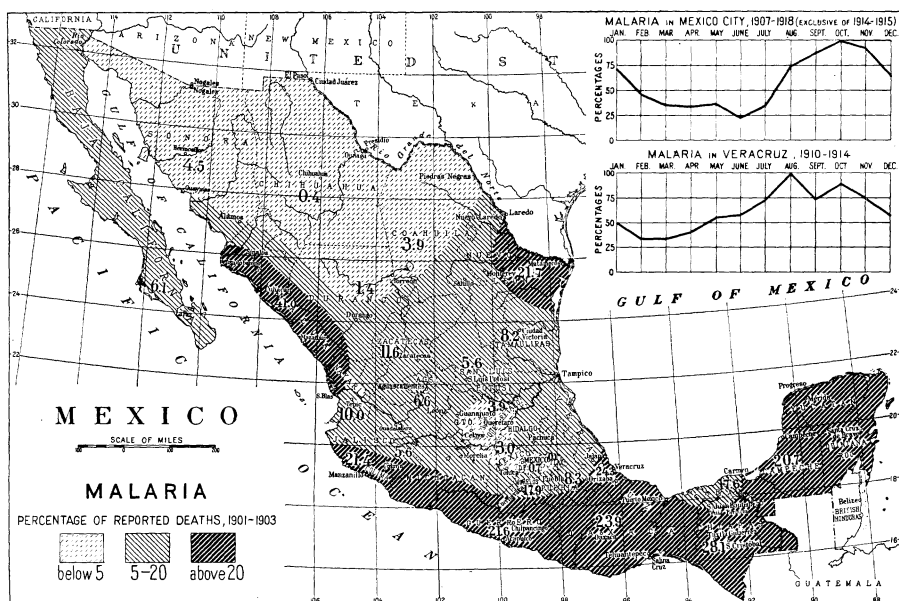


FIG. 3

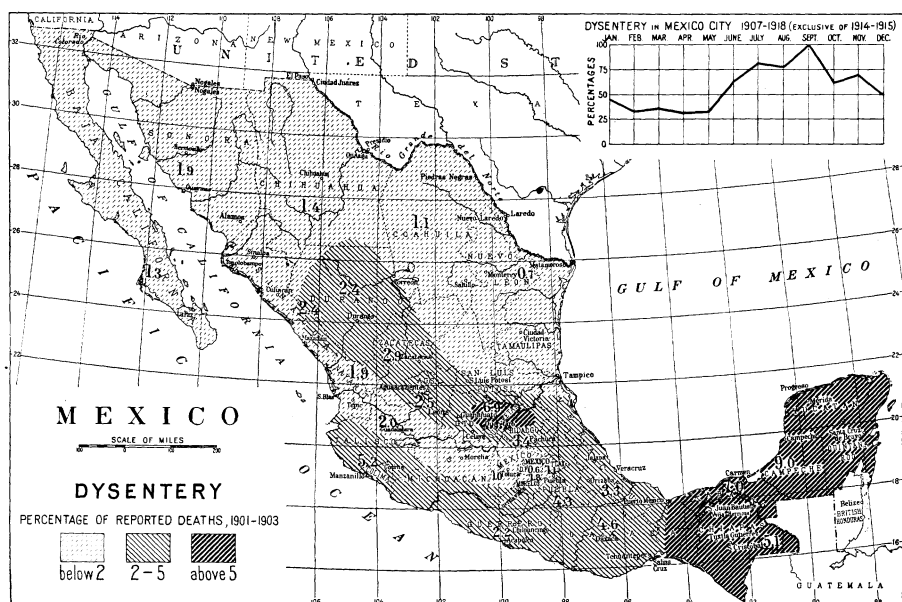


FIG. 4

FIG. 3—The highest and the driest parts of Mexico are the freest from malaria. In the low parts and the moist parts, as would be expected, the disease increases rapidly during the rainy period and immediately after its close.

FIG. 4—The significant feature of this map is that dysentery increases enormously in the lowlands and in the more southern parts of the country. The monthly instances of the disease show how steadily it increases through the summer season when fresh fruits and vegetables are most abundant. It increases at a time when the death rate in general diminishes.

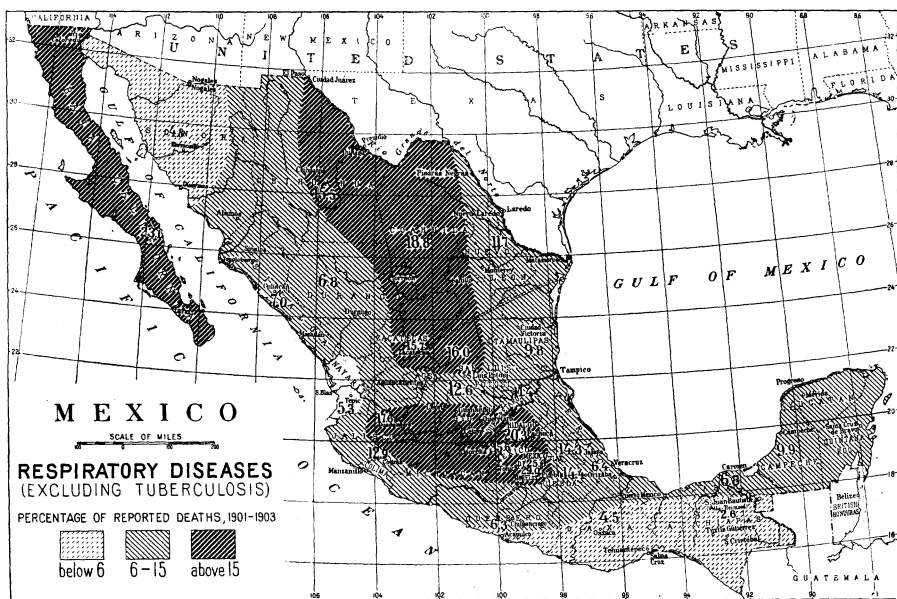


FIG. 5

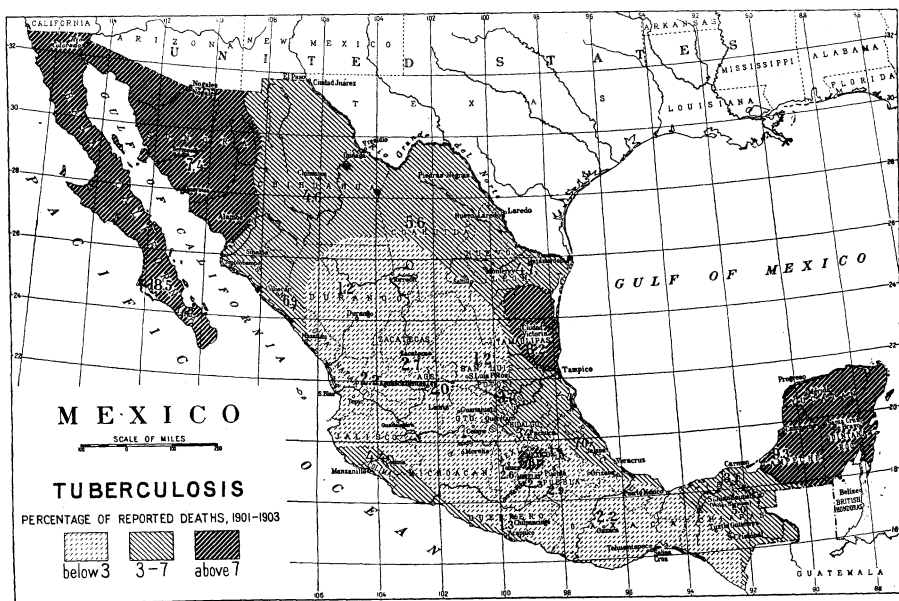


FIG. 6

FIG. 5—Respiratory diseases are much the worst at the highest altitudes. This map affords one of the best indications of this fact, but it also seems to indicate that respiratory diseases are severe in the drier parts of the country. The figures for Lower California and Sonora are based on so small a number of deaths that they are of little value. The state of Nayarit should be shaded with the lightest tint.

FIG. 6—The contrast between the maps for tuberculosis and for other respiratory diseases is remarkable. Except in Mexico City, where there is a great increase, the highlands seem to have the least tuberculosis while the lowlands and the dry parts of the country have the most.

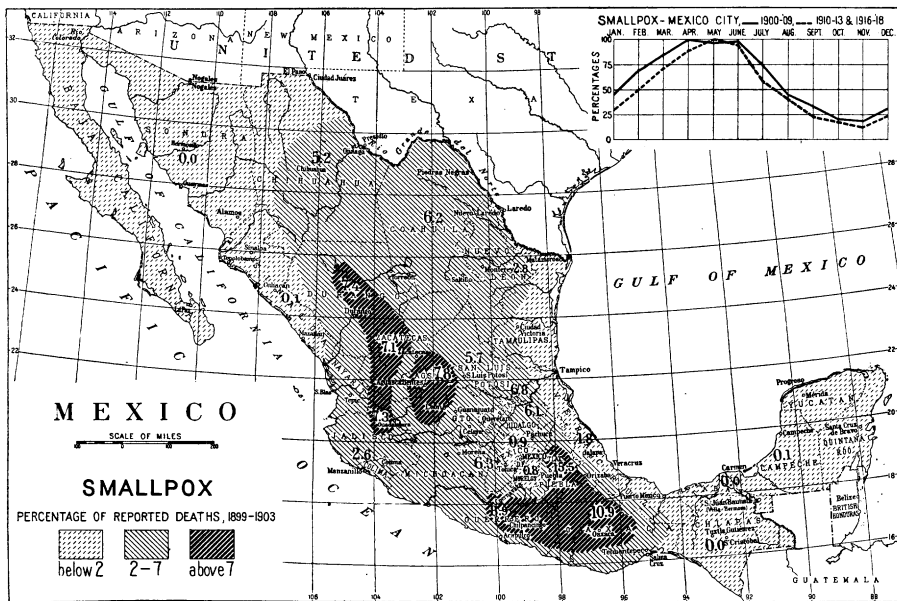


FIG. 7

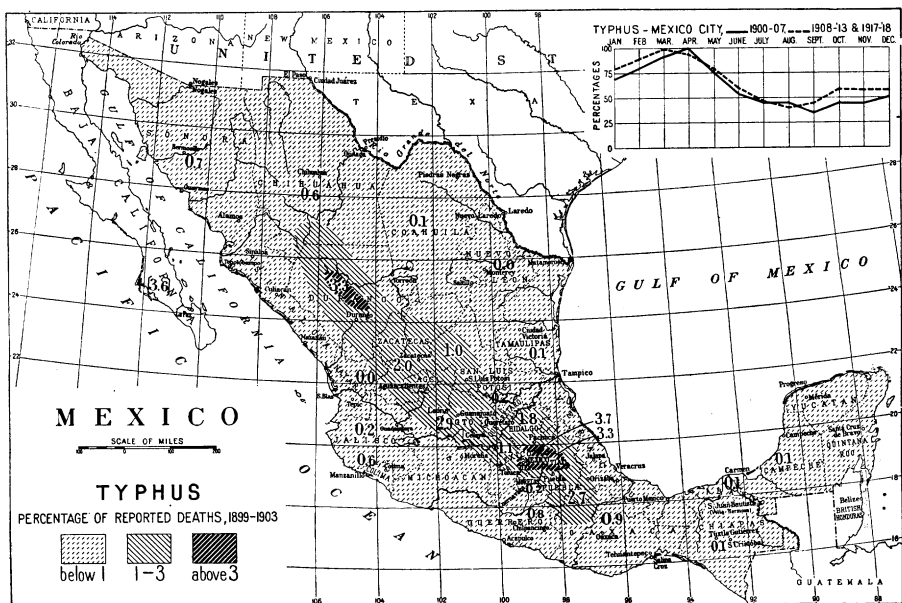


FIG. 8

FIG. 7—The map for smallpox is somewhat irregular because of the low death rate around Mexico City. Otherwise it seems to indicate that this is a disease of the highlands, especially of the more tropical and rainy portions, whereas it is infrequent in the lowlands. It is most common in the driest months and in this respect agrees with the death rate in general.

FIG. 8—Typhus, like smallpox, is primarily a disease of the highlands. This is largely because of the denser population and the much less attention to cleanliness. In this map, as in the others, the figures for Southern California are on too small a basis to be significant.

the contrary, dry heat is not so good as that with a reasonable amount of moisture.

THE EFFECTS OF ATMOSPHERIC MOISTURE

This conclusion as to humidity is so contrary to accepted beliefs and at the same time so important that further evidence is needed. Let us take the number of deaths at different seasons in Mexico City as shown in Figure 2. The most notable feature of Figure 2 is that the death rate increases from a minimum in November to a maximum in May. This can have nothing to do with the temperature; for, while the death rate increases with the coming of cool weather and is fairly low in January when the mean temperature is 53° , it keeps on increasing until May, the warmest month, with a mean temperature of 65° . This latter figure is practically the optimum, or most favorable temperature for mankind in general.⁴ Yet at this temperature the health of the Mexican plateau is at its worst. Something else seems to be the controlling factor, and that something is apparently dryness, or else some condition such as too much light or dust which goes with dryness. There is an almost regular increase in the death rate throughout the dry season. April and May are the driest months of the year and have the highest death rate. Then during June the rains begin, and the death rate falls markedly and drops off thirteen per cent in the next two months. After the rainy season has passed its height the death rate begins to increase a little but declines slightly once more under the stimulus of cooler weather only to increase with the dry warm weather of spring.⁵

Mexico is not alone in its indications as to the harmfulness of dry air. In India, as appears in the ten-year seasonal curve of Figure 2, the dry winter season, in spite of its more favorable temperature, is much less healthful than the wet season in summer. An example from quite a different climatic region is also worth citing. In Boston an examination of all the operations for five years at one large hospital and for ten years at another shows that the weather has the same effect on operations as on the health and vigor of the community as a whole.⁶ Let us take all the days at Boston when the temperature at 8 A. M. on the day after the operation ranged from 40° to 70° F., thus corresponding to the range at Mexico City throughout the year. If we divide these days according to the relative humidity at 8 A. M., we get the number of deaths per day at the two hospitals (Table III).

⁴ Ellsworth Huntington: *World Power and Evolution*, Yale University Press, 1919.

⁵ In seeking the cause of the ascending mortality curve during the dry season in Mexico City it would seem necessary to consider also the effect of the great amount of dust in the air that is breathed. So fine is the alluvial sediment deposited formerly in the lake bottom but now exposed by desiccation of the lake that the slightest breeze raises it into the atmosphere. For weeks at a time the near-by mountains are completely obscured by this haze which hangs over the city. Its presence in the air during this dry season must greatly aggravate all such diseases as affect the respiratory organs. The summer rains clear the atmosphere and lay this dust, thus restoring the mountain air to its wonted purity.—EDIT. NOTE.

⁶ Ellsworth Huntington: *Air Control and the Reduction of the Death Rate after Operations*, *Modern Medicine*, Chicago, Vol. 1, 1919, pp. 463-468 and 555-558.

The driest days with a humidity of 60 per cent or less have a death rate 20 to 40 per cent greater than the moistest days. But at Mexico City and throughout the larger part of the plateau where the majority of the Mexicans live, most of the winter days and more than half those of the whole year fall in a group as dry as the driest group in Boston. Hence it appears by no means accidental that the dry cities in Table I are the ones that show the highest death rate.

TABLE III—DEATHS PER DAY AT BOSTON HOSPITALS AFTER OPERATIONS

TEMPERATURE AT 8 A. M.	RELATIVE HUMIDITY AT 8 A. M.			
	UNDER 60	61-80	81-100	91-100
61°-70°	0.415	0.391	0.381	0.346
51°-60°	0.460	0.395	0.334	0.271
41°-50°	0.503	0.440	0.444	0.415

EFFECT OF HUMIDITY AT HIGH TEMPERATURES

In our surprise at the effect of dryness we must not overlook the equally adverse effect of extreme humidity at high temperatures. This is illustrated by the dotted line in Figure 2 which shows the seasonal variations in the death rate at Veracruz from 1910 to 1913. In the warm lowlands of Mexico the winter months are better than those of summer not only because they are cooler, but because they are drier. The effect of humidity at high temperatures is admirably illustrated by the following figures showing deaths after operations at the Boston hospitals when the thermometer is above 70° at 8 A. M.

TABLE IV—DEATHS PER DAY AT BOSTON HOSPITALS AFTER OPERATIONS WHEN THE TEMPERATURE IS OVER 70° F. AT 8 A. M.

RELATIVE HUMIDITY	DEATHS PER DAY	RELATIVE HUMIDITY	DEATHS PER DAY
Under 40	0.937	71-80	0.347
41-50	0.489	81-90	0.500
51-60	0.244	91-100	0.775
61-70	0.280		

Table IV shows clearly that at high temperatures people's health is remarkably sensitive to extremes of either dryness or moisture. The Mexican lowlands and the northern parts of the plateau have a great many days of high temperature, and most of these unfortunately are either much too moist or much too dry.

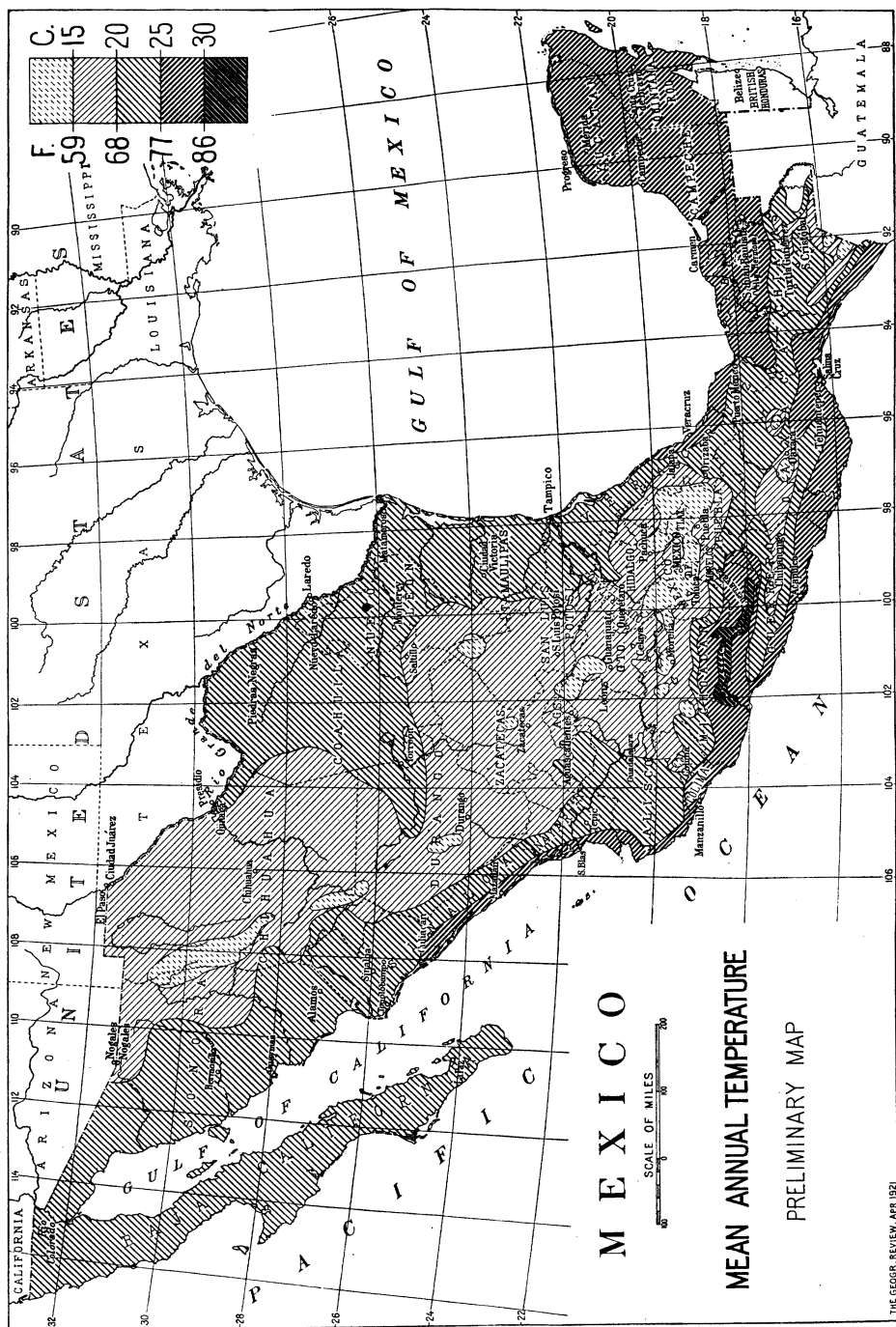


FIG. 9.—The map of mean annual temperature is based almost entirely on the map by P. P. Calvert in F. D. Godman (ed.): *Biologia Centrali-Americana, Zoology*, Vol. Neuroptera (Odonata), London, 1892-1908. The data on which this map was based were published in the *Monthly Weather Rev.*, Vol. 36, 1908, pp. 93-97. Scale of the map 1:17,500,000.

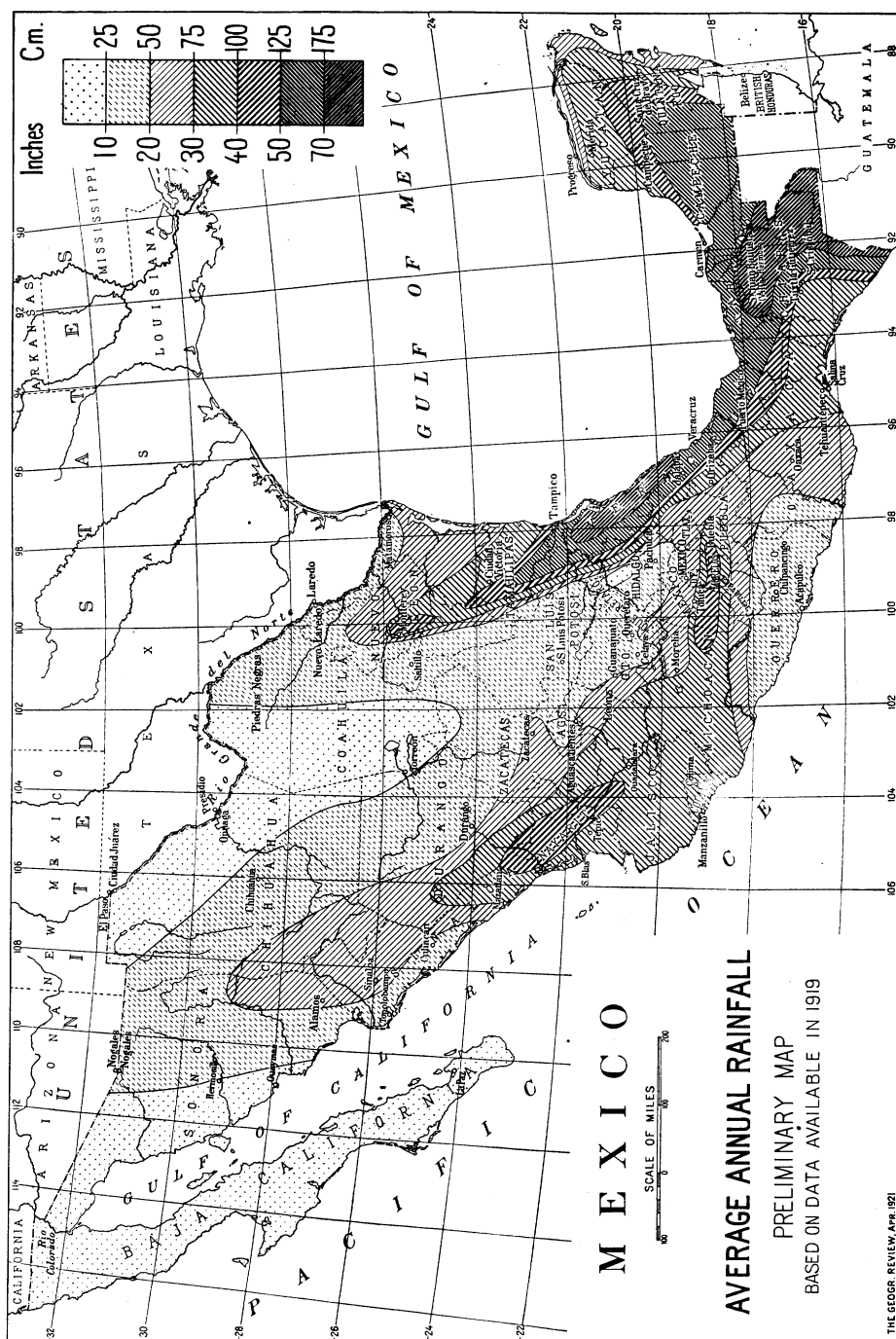


FIG. 10.—The map of mean annual rainfall is based on all the data which were available in 1919 in the files of the U. S. Weather Bureau. These files were kindly placed at the disposal of the compiler, but the Weather Bureau has no responsibility for the compilation. All records of more than five years' duration were used. While the general indications of the map are correct, the rainfall of Mexico varies so greatly in short distances that the ultimate map will be much more complex than the present one. In particular more data are required for the Pacific coast south of Mazatlán.

THE RELATION OF TEMPERATURE TO HEALTH IN MEXICO

Having seen how unfavorable are the conditions of relative humidity in Mexico, let us now see what effect the temperature has upon the health and energy of both the body and the mind. Table V shows (1) the mean temperature of the coldest month, (2) of the warmest, (3) the difference between these two, and (4) the altitude of some of the chief places in Mexico.

TABLE V—TEMPERATURES OF SOME OF THE CHIEF PLACES IN MEXICO

(In degrees Fahrenheit)

CITY OR TOWN	MEAN TEMPERATURE OF COLDEST MONTH	MEAN TEMPERATURE OF WARMEST MONTH	SEASONAL RANGE	ALTITUDE (<i>in feet</i>)
1 Oaxaca	63°	73°	10°	5162
2 Mexico City . . .	52°	65°	13°	7500
3 San Luis Potosí . .	55°	71°	16°	6200
4 Zacatecas	52°	66°	14°	8200
5 Durango	54°	73°	19°	6200
6 Saltillo	53°	73°	20°	5400
7 Monterrey	56°	85°	29°	1600
8 Matamoros	63°	84°	21°	Sea level
9 Veracruz	70°	82°	12°	Sea level
10 Mérida	72°	83°	11°	Sea level
11 Salina Cruz . . .	75°	82°	7°	Sea level

The table is arranged in such a way that stations 1 to 6 represent the high plateau, the best part of Mexico as regards temperature. Stations 7 and 8 represent the northern lowlands which are an intermediate region, while 9 to 11 represent the southern lowlands, the worst part of the country. Let us begin with the southern lowlands. Even at Veracruz the mean temperature of the coldest month for day and night together is 70° F., or six degrees higher than is best for physical health as proved by the study of millions of individuals, and nearly 30° higher than that which stimulates the people of more northern lands to plunge into their work with redoubled energy each year at the approach of winter. In summer the temperature for night and day together averages 82°–85°, which is more than 10° higher than the hottest month in New York City. The absolute maximum in New York, to be sure, is higher than in these tropical regions, but that is of slight importance compared with the enervating way in which day after day and month after month the thermometer rises to 90° or more each noon in the Mexican lowland. People simply cannot be energetic. It is not a matter of choice, but of actual physical inability. For a short time, to be sure, they may rouse themselves to great exertion, but the weariness thus induced demands a long period of recuperation. If people

are to maintain even the low state of vitality which passes for health in the tropics, they must go at things easily and slowly, or else must have long periods of rest. Even so, they are afflicted with minor and generally unrecognized ailments most of the time. They never know the zest and vigor that make work not merely easy but often delightful under a more favorable climate.

Turning now from this worst part of Mexico to the best part, we find that in our table the more populous part of the highland is represented by Mexico City, San Luis Potosí, and Zacatecas. The regions typified by these places contain about half the people of Mexico and are much the most important sections. So far as mere physical activity is concerned, the mean temperature is excellent. The average winter temperature for day and night together ranges from 52° to 55°, while the summer temperature varies from 65° to 71°. Thus much of the year the temperature is close to the optimum for physical health. Perhaps this is one reason why the Indians of the plateau are comparatively strong and active and are able to run astonishing distances with heavy loads on their backs. Nevertheless, as we have already seen, the death rate is three times as high as in the best part of the United States or England. The extreme dryness of the long winter presumably has much to do with this, but the lack of variability is also important. While the winter weather is very pleasant, the temperature rarely falls low enough to cause frost, and the conditions which produce the maximum mental stimulus are rarely reached. Worse than this is the fact that the change from season to season is comparatively slight; and worst of all, the change from day to day is still less marked. At Mexico City the average variation from one day to another is only from a third to a fifth as great as in the northeastern United States. Such variations, except in cold weather, are one of the greatest aids to health, as appears from numerous studies of the question in New York and Boston. In Mexico, however, what few marked changes of temperature there are, probably do more harm than good, because they are so infrequent. Where people are subjected to frequent changes of temperature, they can stand a cool wave and are greatly stimulated by it. Where they live, however, in a relatively uniform climate such as that of the Mexican plateau, even a moderate drop of temperature is apt to chill them and hence to neutralize whatever beneficial effect might otherwise arise.⁷

⁷ While the day-time temperatures in the shade on the Mexican highlands vary but little from season to season, there are frequent extreme changes met with in the immediate fall of the thermometer after sundown, and in passing from sun to shade. Data published by the Observatorio Meteorológico Central at Tacubaya, just outside of Mexico City, show that at all seasons of the year these severe changes occur, the difference between day and night temperatures frequently amounting to 25° F. and reaching as much as 35°, while from sun to shade the difference is greater still. These variations are no doubt too frequent, sudden, and extreme to serve as a stimulus to the inhabitants, but rather expose them to constant danger of colds, thus aiding in the development of bronchitis, broncho-pneumonia, pneumonia, tuberculosis, and the diseases of the digestive apparatus, the ailments that cause most of the deaths in Mexico City. In this connection see "Climatología de la República Mexicana, desde el punto de vista higiénico," by José Guzmán, in *Memorias Soc. Científica "Antonio Alzate,"* Vol. 20, 1903, pp. 181-289.—EDIT. NOTE.

INDIRECT CLIMATIC EFFECTS

In addition to all these direct effects of climate there are certain indirect effects. One is the insects—mosquitoes, fleas, lice, ticks, and many other kinds of obnoxious vermin. Some bring malaria, typhus, and the hookworm disease; others merely cause an incessant irritation which those who have not experienced it can scarcely comprehend. Again, the Mexican diet is poor, partly because corn and beans are intrinsically a poorer diet than wheat and meat; but also because of the inertia due to other causes that prevents the people from properly varying and preparing their food. Once more, the inertia arising primarily from the climate causes the people to be slow in taking remedial measures when some minor ailment afflicts them. Thus the little troubles hang on and on, sapping the vitality and finally causing premature death.

RACIAL COMPOSITION OF THE MEXICANS

Now that we have gained some appreciation of the poor conditions of health in Mexico and of the climatic causes which are responsible for them, we are ready to inquire what effect these conditions of climate and health have upon racial character. Let us preface this inquiry, however, by briefly recalling certain well known facts as to the races which make up the Mexican people. First come the Indians, a varied assortment of tribes, some with high abilities and some with low. So far as their capacities can be appraised, the Indians of certain stocks, such as the Mayas and, to a less degree, the Aztecs, are by no means to be despised. Not only do they possess the germs of greatness, but in many instances these germs have come to fruition. Nevertheless, the Indians as a whole do not seem to be endowed with minds equal to those of the more advanced races of Europe.

Over against the Indians stand the Creoles, or people of Spanish descent. So far as heredity is concerned, there is reason to think that they rank quite high. Many of the original Spanish emigrants were undoubtedly mere adventurers or worse, but the great majority were at least men with more than the ordinary degree of initiative and boldness, and a fair proportion possessed unusual ability. Thus, though the Creoles of today might be expected to inherit a certain inconstancy of temperament, they would also be expected to inherit the germs of real genius.

The union of the dull, stolid, steady Indian, with his occasional streaks of ability, and the adventurous, versatile, and inconstant Spaniard with his strong admixture of brilliancy has produced the third great element of the Mexican population, the mestizo. It is a biological law that the mixture of diverse types tends to produce extremes. This is obviously true of the mestizos. Some are completely dominated by the sluggishness of their duller Indian ancestors, while others show only the brilliant and adventuresome spirit of their best Spanish ancestors. Sometimes the good qualities of both the Spaniards and the Indians are united, and we get men like Díaz

who possessed a quick brain and a fertile imagination combined with great steadiness of purpose and strong self-control. At other times the evil qualities of both types combine, and we get stupid, cruel, and inconstant mestizos who become the worst bandits.

THE EFFECT OF CLIMATE AND HEALTH ON MEXICAN CHARACTER

Lack of space forbids us to analyze the effect of climate and health upon each of these three types separately, but in general what is true of one is also true of the others. To begin with the lowlands, by far the worst effect is the retardation of mental activity. Anyone who has watched his own mental processes knows that it is often difficult to think a problem through to the end; the mind revolves again and again in the same limited channels. He knows perhaps that he ought to undertake something, but it is very difficult to decide which of several things to begin and how to begin the one that is finally chosen. This lack of the power of concentration and of prompt action is one of the most marked characteristics of ill health, and ill health is the great bane of Mexico. While the people who live in a climate like that of the Mexican lowlands may not happen to be suffering from any specific disease, they practically all suffer chronically from anaemia and other unknown and unnoticed ailments which prevent energetic action. Such conditions make the inherent stupidity of the Indians more marked, while they increase the nervousness and irritability of people of Spanish blood.

Turning now to the highlands, think what it means when the best part of a country has three times as much sickness as our ordinary cities. Remember that for every death in the United States there are perhaps 300 days of severe sickness, and perhaps 6,000 days of little ailments. If our work is some dull routine process where no thought is required, the fact that we are physically below par may make little difference, but when it comes to intense and protracted thought the difference between the man who is ill and the one who is well reaches a maximum. So it is in Mexico, and the number of people whose mental work is befogged in this way is approximately three times as great as in London or New York.

Among the Indians who have been subjected to the unfavorable conditions of the plateau for an indefinite period, the more active and nervous types seem to have been largely weeded out by natural selection. Such types are apt to include the leaders who compel the rest to make progress, and their elimination is an almost irreparable loss. Among the Creoles the same tendency towards the weeding out of the more alert types is apparently going on, and the Spanish element in Mexico appears to be trending toward the relative inertia of the Indians. Nevertheless, the old nervous qualities still remain and are apparently intensified by the climatic surroundings. Hence the Creoles are excitable, unstable, and lacking in self-control. With these qualities goes an inability to apply themselves to steady work, an inability like that which we have described in the lowlands, save that it is less pro-

nounced. Yet it shows itself continually. Even among the best of the Mexicans relatively few can plan out a great piece of work in all its details and then go through the drudgery of carrying it out. Great plans, indeed, are made with ease and are proclaimed on the housetops, but the mental and physical health to carry them out is rarely present.

All these results of the Mexican environment, whether they be direct or indirect, combine to produce much of what is commonly called the racial character of the country. The fact that the body and mind are not sufficiently stimulated manifests itself in various ways according to temperament. In some persons it takes the form of ready bursts of anger; in others it leads to immorality, boastfulness, false pride, and disregard of law. Again, it seems safe to attribute to such cause a good deal of what we call the "dishonesty" of the Mexicans, and also the apparent cruelty and indifference. The Mexican sees a horse suffer from a sore on its back. He feels sorry for the animal and wants to relieve the strain, but it is too much trouble. If he had sufficient energy, he would wash the sore spot, repair the saddle, and take care of the animal's back, but instead of so doing he sits lazily around and then loads the animal next day in spite of its shrinking. Thus the Mexican becomes callous to the pain of others, and this sort of thing continued through many generations makes people indifferent to all sorts of suffering and injustice whether among animals or among men. It is well known that, in general, strong people are apt to be also gentle and considerate.

Another unpleasant trait which often strikes the foreigner in dealing with Mexicans, is their failure to think things through to the logical conclusion. Part of this failure, no doubt, is due to the innate stupidity of certain individuals and to lack of training, yet the physical and mental inertia which we are here discussing have much to do with it. Almost everyone knows that the reasoning which we do at two or three o'clock in the morning after we have lain awake most of the night, is apt to be poor. We conjure up all sorts of difficulties and cannot see them in their true proportions because we are physically depressed. In the same way the Mexican, because he is chronically below par in health, is apt not to reason things through fully. To cite the old example, he tells the weary traveler that his night's resting place is only a mile away when it is actually five. This is doubtless because he wishes to please the traveler, but if he reasoned the matter through, he would conclude that the traveler would be far better pleased in the long run if told the exact truth. His answer, in a certain way, is like the impatience of the sick man. He does not stop to reason that he will get much more by being considerate than by being harsh.

THE RELATION BETWEEN HEALTH AND CHARACTER IN CHILDHOOD

At this point we may well turn back once more to the Mexican mortality statistics. It is well known that the character of the great majority of

people becomes relatively fixed by the time they are twenty: many authorities say that the first five years are more important than all the rest put together. The sickly child is terribly handicapped. This being so, it may help us to understand Mexican character if we study the death rate by ages. On the basis of figures given in the official reports of the Mexican census of 1910, Wallace Thompson in his excellent book "The People of Mexico" (New York, 1921) finds that the apparent death rates for that year at various ages were as appears in column A of Table VI.

TABLE VI—COMPARISON OF MEXICAN AND NATIVE AMERICAN DEATH RATES

AGE GROUP	A	B	C
	DEATH RATE IN MEXICO IN 1910	DEATH RATE IN THE U. S. REGISTRATICN AREA IN 1911 AMONG NATIVE WHITES OF NATIVE PARENTAGE	RATIO OF A TO B
Under 1 year	241.0 (365.0)	102.2	2.36 (3.56)
Under 5 years	80.7 (89.5)	29.8	2.71 (3.00)
From 5 to 9 years	16.0	3.1	5.17
From 10 to 14 years		2.2	
From 15 to 19 years	12.1	3.4	3.57
From 20 to 29 years	14.4	5.0	2.88
From 30 to 44 years	19.9	6.2	3.20
* From 45 to 64 years	35.2	12.8	2.75
* From 65 years upward	97.7	64.6	1.51

* The division between the last two groups comes between 59 and 60 years in the Mexican figures.

The figures in parentheses in column A, and likewise in column C, probably ought to be substituted for the others. The reason for this appears in Table VII, which is inserted partly to show how difficult it is to deal with Mexican statistics. The two columns of figures in Table VII show the number of persons of various ages in a Mexican population of 15,160,369 and in a standard or typical population of 15,445,608 in the northern United

TABLE VII—CHILDREN OF VARIOUS AGES AMONG MEXICANS AND IN A TYPICAL POPULATION OF SIMILAR SIZE IN THE UNITED STATES, 1910

AGE GROUP	MEXICANS	AMERICANS
Under 1 month	60,172	24,180
1-6 months	205,049	116,586
6-12 months	512,417	134,793
Under 1 year	777,638	275,559
1-2 years	467,943	261,285
2-3 years	467,977	256,587
3-4 years	461,849	254,049
4-5 years	457,761	252,348

States in 1910. The much greater proportion of children among the Mexicans means not only that the birth rate in Mexico is high but that relatively few people live beyond middle age.

For our present purpose the important feature is that the number of infants from 6 to 12 months of age in Mexico in 1910 according to the official figures was nearly twice as great as the number under 6 months of age—512,417 against 265,221—whereas the corresponding figures for the United States are 134,793 and 140,766. This is, of course, absurd, for in times of peace and relative prosperity the number of children born in two successive periods of six months never differs by more than a few per cent. Probably the number 512,417 is the total of all children under a year in age. This would leave 247,196 from 6 to 12 months of age. Or possibly, though less probably, the number 512,417 should be 212,417. Either supposition makes the Mexican figures in Table VII consistent with one another and with those of the United States, for it removes the impossible excess of children in the lines labelled “6–12 months” and “Under 1 year.” The corrected numbers in parentheses in Table VI are based on the supposition that 512,417 is the number of children under 1 year of age. Such corrections emphasize the fact that Mexican statistics are not only carelessly collected but heedlessly tabulated.

THE HIGH INFANT MORTALITY

Turning back to Table VI, column B shows the death rate per 1,000 during 1911 among about 24,000,000 native whites of native parentage in the registration area of the United States with the omission of the three most southerly states, North Carolina, Maryland, Kentucky. Only one year is used; but it was a typical year, and the basis of population is so large that more years would not appreciably affect our results. For Mexico no other years are available. Column C in Table VI gives the number of times by which the Mexican rate exceeds the native white rate in this country. At the ages of 5–9 and 15–19 respectively the Mexican death rate is 5.17 and 3.57 times as great as among the native white Americans. Among older people this excess gradually, though irregularly, diminishes. The great falling off among old people is probably because their deaths are recorded less carefully than those in the prime of life. Moreover, the age of old people is frequently overstated. For example, while Mexico purports to have about one-fifth as many people aged 70 as have the native American whites in proportion to their numbers, she claims over four times as great a proportion over 100 years of age.

Among young children, as well as among old people, the ratios in column C of Table VI appear to be less than at the ages of 5–14, but this is almost certainly fictitious. All backward countries show the same tendency toward carelessness in recording the deaths of old people and still more of children, especially very young infants. It is well known that in advanced countries

the greatest medical progress has been made in the reduction of infant mortality, whereas backward countries have done little along this line. Hence there seems little doubt that the ratios in column C of Table VI should be larger in infancy and early childhood than at any other time. Accordingly it seems safe to estimate the ratio for infants under 1 year in column C as 6.0 or even 7.0 and for children under 5 years as 5.5 to 6.0 or possibly more.

Even these estimates, however, are below the truth. They are based on an annual death rate of 30.8 for Mexico as a whole; but this is calculated from figures collected by unskilled and careless census agents. When it is remembered that even in the United States no reliable mortality figures are available for nearly half our area, there will be no surprise if Mexico's actual death rate should prove to be a third larger than is reported. Even that, however, would make it less than the reported rate for Mexico City. All things considered, then, it seems probable that among Mexican children under 15 years of age the death rate is from 5 to 8 times as great as among native white children of native parentage in the northern United States. On an average, however, even such American children suffer more from illness than do those of the more intelligent tenth from whom are drawn the readers of this article. Hence the death rate among average Mexican children is probably 6 to 9 times as great as among the relatives and friends of the reader. If that is so, it would seem as if Mexican children must suffer from illness 4 to 6 times as much as do the children of our own most intelligent communities. How great an effect this may have upon character, I have tried to show in the article referred to on page 243. Almost certainly it must mean that inherited weaknesses of racial origin are intensified. If the Spaniards as a race are lacking in persistence, or if they are not gifted with great self-control, these qualities are sure to be exaggerated if the childhood is sickly. If the Indians are stolid and stupid, repeated periods of ill health in childhood will certainly not help to overcome these traits.

In all this discussion of the effect of climate upon health, and upon character, it must be recognized that many causes are working together. Hence it is almost impossible to distinguish between things that a man does because he is stupid, those that are the result of bad training, and those that occur because his health is poor. In this article we are merely pointing out ways in which the general enervation produced by the climate of Mexico tends to increase tendencies which may exist for other reasons. If the Mexicans were all of high mental caliber—if, for instance, they were equal to the Puritans who settled in New England—doubtless their lot would be much improved. If they were properly educated and trained, there would also be improvement. All the disadvantages of the country work in a vicious circle, each accentuating the other. What Mexico needs from foreigners is first an appreciation of the many fine qualities which are still innate in all parts of her population; second, a realization of the way in which these good traits are often smothered by sheer lack of energy and will power because of

a great variety of unfavorable conditions of physical environment and health; and third, a sympathetic comprehension of the steps by which the forces of historic development have interplayed with heredity and environment to produce the present tangled web. Without help from outside or without some rare inherent capacities it is doubtful whether any race could successfully resist the unstimulating and discouraging effects of the Mexican physical environment. Yet if we can discover just how the environment acts to produce its depressing effects and can then pass on our knowledge and help in its application, there is little doubt that a large part of the climatic handicap can some day be overcome.